Scientific Crossbow Test

By Jon Teater

TenPoint produces top quality crossbows year after year, assembling them in the Ohio plant from components supplied by American vendors. The two latest releases in the TenPoint line are the Lady Shadow and Stealth FX4.

The Lady Shadow is designed to appeal to the growing percentage of women in the hunting market. Core TenPoint features, such as the FSB (Functionally Superior Bullpup) stock and Extreme Limb Technology, are combined with flashes of pink coloring throughout to make this latest release a big seller for TenPoint.

The Stealth FX4 is the focus of this article and TenPoint is quite pleased with its latest high-tech crossbow. The Stealth FX4 is considered a faster version of the Stealth SS. If you do not remember, the TenPoint Stealth SS evolved from the Stealth XLT.

The evolution of the Stealth model has been interesting to watch. The product of today is much more efficient, compact and aggressive looking than its predecessors. When comparing the Stealth SS and the Stealth FX4, speed is not the only distinction. Facets such as axle-to-axle length at full draw, dynamic efficiency, power stroke and average speed per inch of power stroke are other distinctions between the two products. Moreover, precision testing reveals the Stealth FX4 has the potential to outdo the competition.

The Stealth FX4 design promotes highly precise field shooting. The core features from TenPoint, which are incorporated into this flagship model, promote an opportunity for comfort and control that many competitors just cannot replicate. Features such as the FSB stock, T2 trigger, FST (Functionally Superior Thumbhole), Pro Elite carbon arrows and solid dovetail scope mount provide exceptional and functional features for the archer. Quality is another strong point of this model. When archers think of TenPoint, they tend to focus on quality. Quality components and design tend to put this crossbow innovator at the forefront for many consumers.

Rick Bednar, TenPoint CEO, stated that the FX4 is "rock-solid: built like a tank but maneuvers like a luxury automobile." From my standpoint, archers that pay over $1,000 for a crossbow want luxury. Those that are willing to pay more for luxury have expectations of bells and whistles. As for me, I expect high quality and extremely functional designs if I am paying top dollar for a crossbow. It is also important to note that Bednar and his team are hunters and they use the products they produce. TenPoint stands behind its products, including the Stealth FX4 and firmly believes that this latest design demonstrates a refined product that meets high quality standards.

Introduction

TenPoint's latest non-gender-specific crossbow reveals a get-it-done, all-purpose attitude. After several years of producing several new products, TenPoint has diversified its product line to include a growing brand, Wicked Ridge and, more recently, Horton Crossbow Innovations. Needless to say, this corporation has been busy. The flagship offering from TenPoint, the Stealth FX4, is an all-around well-balanced crossbow. The Stealth FX4 provides a blend of speed, compactness, efficiency and functionality. These facets make this crossbow a top competitor for 2015.

The Stealth FX4 is offered in two packages. The packages differ slightly; the Stealth FX4 can be equipped with either the ACUdraw or ACUdraw 50. The product tested for this article included an ACUdraw 50, a 3x Pro-View 2 Scope and a Bowjax Dampening Kit. In addition, an ambidextrous side-mounted quiver and bracket are included. The package is topped off with three Pro Elite carbon arrows sporting Omni Nocks. Overall, this package is complete and an archer or pro shop should require approximately 45 minutes if not less for assembly and sighting in.

The Stealth includes many technologies, some of which I have already mentioned and others I will provide more details on throughout this article. At the front, a foot stirrup, coated to prevent rattling, is connected to an aircraft grade aluminum riser. The riser sports limb pockets referred to as the "Over-the-Top" limb pocket/Zytel limb suspension system, which is designed to separate and isolate the limbs from direct contact with the riser. The pockets secure 11 inch

TenPoint Stealth FX4

Contact Info	TenPoint Crossbow Technologies www.tenpointcrossbows.com		
MAP:	$1,199 (ACUdraw 50)	Finish:	Mossy Oak®Country®
MAP:	$1,299 (ACUdraw)	Cams:	HE2™
String Material:	DynaFLIGHT 97	Riser:	Aluminum

Performance at a Glance:

Arrow	Speed	K.E.	Momentum
425 Grains	346.0	113.0	21.0
475 Grains	330.9	115.5	22.4
525 Grains	317.7	117.7	23.8

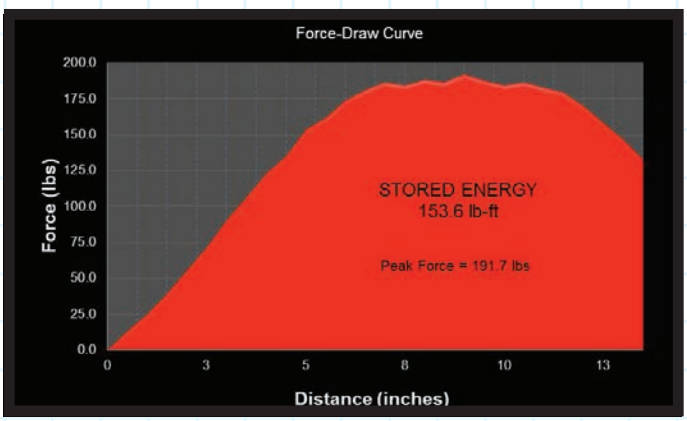
Dimensions						
Model	Axle-to-Axle (inches)	Axle-to-Axle (full draw) (inches)	Power Stroke (inches)	Overall Length (inches)	Mass Weight (including scope)*	Mass Weight (without scope)*
TenPoint Stealth FX4	17.75	13.25	13.375	34.25	9.41 lbs	8.50 lbs

The measurements include the ACUDraw 50, which adds approximately 1 pound.

IsoTaper Limbs; this is premium technology referred to as "Xtreme Limb Technology." The pocket and limbs are angled to create a more compact design. The limbs are just over 13 inches axle-to-axle at full draw, creating a reduction of more than 4 inches from the static position. At the end of the limbs are HE2 (Hybrid Eccentric 2) cams. These modest cams help create significant energy. The speed results close in on 350 feet per second (fps) with a 425 grain arrow. With an arrow weighing in at 370 grains, speed results are advertised to reach 370 fps. Please pay attention to the arrow safety section of the user manual, which recommends arrows weighing no less than 420 grains, shafts at least 22/64 of an inch in diameter and only the use of Omni Nocks.

The riser is connected to the 19.5 inch barrel through one bolt. This should not be of concern, as the tight tolerance components fit exactly. The riser block assembly connects precisely to the barrel through the Vibra-Cush component. This patented component is designed to reduce vibration transmission between the riser and barrel. Dispensed on the stirrup, limbs and retention spring but also sandwiched in the barrel are Bowjax Dampeners. Bowjax creates a highly touted rubber-like dampener that is designed to reduce noise and vibration. The location of the dampeners is ideal for the application.

As you move to the middle of the crossbow, you will notice a key safety feature that is sandwiched between the slotted barrel and molded fore-grip. The winged component is made from rubber and referred to as "safety wings." The wings are marked with white letters directing archers to keep hands/fingers below the guard. Failure to abide by this can cause major injury. At the rear of the safety wings is the T2 Trigger. The trigger is protected by a guard and designed with metal-injection molding. The T2 is advertised at 3.5 pounds of peak weight.



Performance Information			
Peak Force		191.7	lbs
Stored Energy		153.6	lb-ft
Dynamic Efficiency	425 grains	73.6	percent
Dynamic Efficiency	475 grains	75.2	percent
Dynamic Efficiency	525 grains	76.6	percent

At the back end of the Stealth FX4 are the FSB, FST and ACUdraw 50. These features tend to be the most noticeable. Each carries its own purpose. The FSB is a mainstay of the design, creating a feel and look that is purposeful and unique. The largest cutout in the stock is the thumbhole. The thumbhole provides more than ample comfort and is in an ideal location. The ACUdraw 50 happens to be one of the most useful components of the Stealth FX4. It is straightforward and works effortlessly to extend/retract the rope and clips, making it a useful feature in the field.

The crossbow dimensions and weights as I measured it out of the box appear in the chart at the top of this page.

Next, the crossbow went through a thorough inspection. The review focused on the string/cables, eccentrics, limb and limb pockets, rail, stock, butt plate, trigger housing, trigger and trigger guard. After a thorough review of the Stealth FX4, I found no flaws or blemishes in the finish. The HE2 cams have some machining marks on the inlaid grooved areas yet this is not overly obvious or concerning to me as a consumer. I would rate this product as exceptional in the workmanship section.

Thereafter, I put the product through a 100 shot cycling to verify functionality. Some minor testing was performed but the focus was to detect any issues or concerns with the product before starting the actual performance testing. The Stealth FX4 performed well in this segment. No major differences were noted from the start to the finish. The string serving had some minor wear, which was caused by the contact of the clips from the ACUdraw 50. Please note the TenPoint rail lubricant is necessary and one application supports up to 75 shots without concern.

The crossbow was next evaluated on the five criteria outlined below:

Dynamic Efficiency: The dynamic efficiency portion of the test utilized a Revere Load-Cell controlled by a winch device; the load-cell connected to the crossbow with a cocking aid. The crossbow was mounted in a shooting platform that controlled any movement that might have been experienced as draw-force curves were taken. The stored energy obtained from the draw-force curve was used in conjunction with speed measurements to calculate dynamic efficiency.

Speed per Inch of Power Stroke: Speed measurements were taken with three projectiles. A Pact Chronograph XP and a Competition Electronics Pro-Chrono IR were set in tandem to record results. The average speed measurement was divided by the power stroke to determine the speed per inch of power stroke.

Noise Output: Sound measurements were recorded with three projectiles. The measurements were averaged

Speed Information									
shot	Weight (grains)	Chrono 1	Chrono 2	shot	Weight (grains)	Chrono 1	Chrono 2	shot	Weight (grains)	Chrono 1	Chrono 2
1	425	346.1	346	1	475	331.2	331	1	525	317.6	317
2		346.0	345	2		330.8	331	2		317.7	317
3		346.3	346	3		330.3	330	3		317.7	317
4		345.6	345	4		331.0	331	4		317.7	317
5		345.9	345	5		331.1	331	5		317.6	317
avg (fps)		346.0	345	avg (fps)		330.9	331	avg (fps)		317.7	317

Speed per Inch of Power Stroke (PS)	Weight	Speed Per Inch of PS
	425 grains	25.9
	475 grains	24.7
	525 grains	23.8
	Average	24.8
Power Stroke	13.375	inches

and the sound meter was set to take measurements with the A-weighted filter (which mimics the human ear).

Trigger Force: The trigger force measurements were recorded in pounds and averaged. An Imada Digital Force Gauge was used to determine the peak trigger force.

Precision Measurements: This provided an indication of how closely groups were shot together when shot by hand from a bench rest or another supportive device. Group size was calculated with extreme spread.

Testing

The Stealth FX4 has a lot of curb appeal. However, there is much more than just physical looks that makes this latest product sellable. The Stealth FX4 met and in some cases exceeded the performance information I received. The efficiency numbers were respectable, the speed measurements were slightly less than advertised, the trigger measurements were slightly higher and the general dimensions (excluding the weight measurements) were almost spot-on.

The most important aspect of the testing from a user standpoint is how well the crossbow actually shoots. As I have written before, 2 inch groups are expected based on my average shooting prowess. The combination of the Pro Elite carbon arrows (including Omni Nocks), Pro-View 2 scope and overall crossbow design created a recipe for excellent results. An overall average of under 1.5 inches proved this product is a true shooter.

In The Field

Hunting season has come and gone in my local area, which leaves no time to consider how this product would perform in a true hunting scenario. Nonetheless, I trudged through the woods behind my house with 2 to 3 feet of snow on the ground, carrying the Stealth FX4 fully outfitted. It was an extreme weather situation in which snow was at an all-time high and temperatures were in the single digits. My range consisted of a treestand perched 15 feet in the air, directed toward a swamp area that at that time was covered in deep snow. A target was set up at 30 yards from the treestand. Several key features stood out during this testing segment and I will discuss them in more detail but in general, they are the balance/fit, stock design and trigger.

The balance point is the initial feature that I noted during my shooting. The pivot point is forward of the trigger and behind the forearm, which seems to be an ideal location for most. The forward weight design permits superb stabilization. There tends to be a general liking of crossbow balance points just forward of the trigger and I suspect archers will prefer this key feature. The other noticeable feature from a fit and use perspective is the ultra-compact design. The Stealth FX4 is easy to handle, maneuvers well and is straightforward during drawing and shooting. Maneuverability is a necessity for my hunting style. The Stealth FX4 fits my maneuverability requirements because of its axle-to-axle and length measurements. Further, the design will likely work well for most archers and should be well suited for use in a treestand or ground blind. Please note that there is no adjustment to the stock and archers should certainly take their time to evaluate this feature during the purchase process.

The FSB has become a mainstay of TenPoint models. One of the foremost features of the stock is the length of pull (distance from the trigger to the end of stock). In this case, the length of pull seemed ideal for my shooting style. The criterion for many when it comes to proper length of pull is easy trigger access. Some may expand what they look for from length of pull so the crossbow also naturally and quickly shoulders well. The Stealth FX4 does just that. As I loaded and rapidly shouldered the crossbow, I reached toward the trigger; I had no hang-ups on the ACUDraw 50. The clips and T-handle stowed away adequately in the ACUdraw 50 housing. As I pressed my face firmly on the stock, my cheek made no contact with the ACUdraw 50. The comb

Sound Measurements			
Weight (grains)	425	475	525
Parameter	Peak A -Weighted Noise		
1	~~96.4~~	94.3	93.4
2	96.1	~~93.9~~	93.7
3	~~95.7~~	~~94.6~~	93.2
4	95.8	94.2	93.3
5	95.8	94.1	93.2
6	96.0	94.0	93.2
7	96.3	94.5	~~93.1~~
8	95.7	94.4	94.1
9	95,6	94.0	94.2
10	95.9	94.1	~~94.2~~
Average	95.9	94.2	93.5
Total Avg Max (dBA)	94.6		

Projectile Precision						
	Model/ Brand	Arrow Weight	Distance (yards)	Spread 1 (inches)	Spread 2 (inches)	Average (inches)
Shooting by Hand	Pro Elite	423.7	40	1.153	1.787	1.470
Shooting By Hand	Pro Elite	423.9	40	1.250	1.410	1.330

Trigger Analysis	
	Trigger Pull (lbs)
1	4.13
2	~~3.58~~
3	3.71
4	~~4.22~~
5	3.89
6	3.79
7	3.82
8	3.95
9	3.75
10	4.10
11	4.01
12	3.78
13	3.99
14	3.86
15	3.89
Trigger Pull	3.90

height of the FSB provided perfect eye to scope alignment. The machined aluminum 7/8 inch fixed dovetail mount provides adjustment for archers who want eye relief options. The other notable stock feature is the FST. The thumbhole is designed to place the shooter's hand and finger in close contact with the trigger. The ergonomics of the grip were created with comfort in mind and ultimately supported stable contact during shooting from the treestand. The rounded edges around each stock feature, including the forearm, provide the added comfort necessary for precise shooting.

TenPoint is pleased with its T2 trigger. The trigger presents a different approach than other companies' designs. Some competitors provide a "firm" trigger. Such a design provides a weight profile with little to no weight stacking and an abrupt or, to some, a positive release. The T2 trigger is designed to be much different from that example. The T2 profile creates a linear weight load over a significant distance of the pull cycle. At the point when the trigger "breaks," the shooter will notice a slightly rounded release. I found the trigger very appealing. In fact, it is likely the primary feature that put my shots on target in the field and at the lab.

Hot Features

Over the years, I have become somewhat familiar with TenPoint products. The Stealth FX4 provides a similar look and feel to several of the more recent TenPoint releases yet it is an improved design. I have to highlight what truly makes this product something consumers will desire. The initial "hot" component is the ACUDraw 50. If you choose the ACUDraw or ACUdraw 50, you are in good hands. The current model of ACUdraw 50 has a more sleek and modernized look. The retention feature seems very rugged and the clips and T-handle stow away much better than on the prior model.

I believe this feature is a must-have in the field and few competitors have been able to replicate its ease of use.

As I have already mentioned, the stock has one of the more ergonomic and form-fitting designs I have tested. The FSB stock and tactical aluminium barrel with a skeletonized appearance intertwine nicely and are also functional and practical. The stock has smooth, rounded edges with great contours that really add to the shooting experience.

The T2 trigger has already been discussed in detail. It is designed just right for my shooting style. The pull cycle profile produces a release that is not sharp but I found that to be a positive because it is predictable and not abrupt. Sometimes, an abrupt or unexpected change can distract a shooter. This feature is a key selling point of this latest model.

I am a proponent of following precise instructions for maintenance. During my review of the manual, TenPoint listed two rail lubricant options. The package received included the Flight Rail and Trigger Lube (HCA-111). This lubricant lasts for approximately 75 to 100 shots. It is unique in that it penetrates metal extremely well without being oily, especially in cold temperatures. TenPoint also offers Microlon's Precision Oiler (HCA-11106), which is applied every 100 to 200 shots. With either option, you will spend very little time in maintenance compared to the amount of shooting time you will enjoy.

The Stealth's evolution is getting to a point where I am unsure the company can make this product much better. I did, however, note one item I believe could be evaluated further. I checked and rechecked all the bolts to ensure proper tightening. The crossbow is a bit louder than I had expected. The dampeners certainly help and the energy produced is more than on prior models. However, the design is somewhat loud. TenPoint may consider evaluating some alternative dampening options or redesigns to help isolate the vibration/sound.

ArrowTrade Scorecard	
Evaluation Criteria	Score
Adjustability	
Craftsmanship	
Design Integrity	
Features	
Performance	
Sound	
Trigger	
Vibration	

Note: The ratings are based on the following color codes:
Blue = exceptional,
Green = above average,
Light Green = average,
Yellow = marginal,
Red = unacceptable

Summary

TenPoint has developed high standards for its staff and products. This company prides itself on the quality products it ships and the industry reputation speaks for itself. Today, the top professional hunters and loyal TenPoint enthusiasts rave about and promote TenPoint products. The marketing from TenPoint focuses little on the aforementioned parties and more on selling the archery dream of a monster buck at the final moments leading up to a well-executed shot. Archers want dependable products and some believe a premium crossbow makes the hunting experience much more enjoyable. TenPoint promotes those last points, as it should. However, I do see something this company does not directly discuss: product shootability. The precision results of this article tell how the Stealth FX4 performed and I suspect the same will apply to most in the field. I believe the accuracy potential of this product is something retailers should promote as customers view and try this model.

TenPoint's leadership stated, "The Stealth FX4 outpaces the competition in terms of quality, technology and shelf appeal. Its combination of size, weight and speed is hard to match. Plus, like all TenPoint crossbows, customers may purchase the crossbow with one of our patented cocking mechanisms: the ACUdraw or the ACUdraw 50. In addition, the Stealth FX4 is backed by TenPoint's Limited Lifetime Operational Warranty and world-renowned customer service." TenPoint's loyal followers, as well as new customers, should enjoy this latest offering.

A special thanks goes to Caldwell Shooting Supplies for providing high definition targets and a sturdy shooting table that was unyielding during testing. Caldwell is a proven supplier to the outdoor industry, producing top-of-the-line shooting supplies.

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